ACADEMIC YEAR 2020-2021

HUDSON VALLEY COMMUNITY COLLEGE
TROY, NEW YORK
COURSE OUTLINE

COURSE TITLE: Electricity I

COURSE SUBJECT AND NUMBER : ELET 100

DEPARTMENT: Applied Technologies

CREDIT HOURS: 4

CONTACT HOURS: _3_ Lecture _3_ Lab

SEMESTER COURSE IS OFFERED: Fall

OFFERED DISTANCE LEARNING: YES: ___ NO: _X_

PREREQUISITES: Basic Algebra and Trigonometry or High School Math I & II

CO-REQUISITES: MATH-150 College Algebra and Trigonometry.

PREREQUISITE(S) OR COREQUISITE(S): None

TEXT(S Introductory Circuit Analysis 10^{TH} Edition by Robert Boylestad , Prentice Hall. 2006

LAB FEES: Yes

FINAL EXAM*:* __X_ Final Exam _____ Final Project

ORIGINAL SUBMISSION DATE: August 2003

CURRICULUM COMMITTEE APPROVED REVISION DATE:

PREPARED BY: Pierre Essis

COURSE DESCRIPTION: Introduction to the basic principles of electricity. Topics covered include electron theory, conductors and insulators, units, current and voltage, resistance, work and power, series and parallel circuits, network theorems, general resistive networks, inductance and capacitance, and time constant, introduction to alternating currents.

ACTIVITIES AND ASSIGNMENTS:
Homework, classroom assignments, computer usage, tests, labs and reports.

GRADE COMPUTATION: (In general terms as defined by college policy. Specifics, including Z grade, will be defined on the instructor's syllabus).

The final grade is the sum of the following three weighted grades:

a) 3 one hour tests : 30% (CL Grade)
b) 6 twenty min. quizzes : 20% (QZ Grade)
c) Lab Reports : 25% (LB Grade)
d) Final Exam : 25% (FE Grade)

Final Grade= {0.50(CL Grade)+0.20(QZ Grade)+0.25(LB Grade)+0.25(FE Grade)}=FG

ADA COMPLIANCE: In compliance with the Americans with Disabilities Act of 1990 and with Section 504 of the Rehabilitation Act, Hudson Valley Community College is committed to ensuring educational access and accommodations for all its registered students, in order to fully participate in programs and course activities or to meet course requirements. Hudson Valley Community College's students with documented disabilities and medical conditions are encouraged to access these services by registering with the Center for Access and Assistive Technology to discuss their particular needs for accommodations. For information or an appointment contact the Center for Access and Assistive Technology, located in room 130 of the Siek Campus Center or call 518-629-7154/ TDD:518-629-7596.

STUDENT BEHAVIORAL OBJECTIVES:
Students will be able to:

- Recognize various types of circuits.
- Apply related circuit laws to measure, calculate and evaluate quantities of direct current circuits, under normal and abnormal operations.
- Document laboratory activities in a precise and objective manner.
- Troubleshoot DC circuits.
- Discuss the validity of the laws applied to the electrical systems.
- Recognize the need for and the ability to engage in lifelong learning.

TOPIC OUTLINE:

1.) Introduction to Electricity
a.) Electrical Engineering Technology Field.
b.) Safety and Precautions in Laboratory Classes
c.) Electrical , Magnetic Quantities and Measurement Systems.
d.) Units, Notations and Conversions

2.) Current, Voltage and Resistance

a.) Nature of Electricity and Electric Charge
b.) Electric Current
c.) Potential Difference (Voltage) and DC Sources
d.) Basic Electric Circuit and the Conventional Current Direction
e.) Resistance and Color Code
f.) Temperature Effects, and Wire Resistance: Circular Wires
g.) Conductance
h.) Measurement Devices:
Voltmeters, Ammeters and Ohmmeters.

3.) Ohm's Law, Power and Efficiency

a.) Ohm's Law
b.) Linear and Non-linear Resistor
c.) Work Energy and Power
d.) Efficiency
e.) Applications of Ohm's Law
f.) The horsepower and Kilowatt-hour
g.) Applications and Troubleshooting

4.) Series Circuits.

a.) Introduction to Nodes and Branches
b.) Series Resistors
c.) Voltage Sources in Series
d.) Kirchhoff's Voltage Law
e.) Voltage Divider Rule
f .) Total Power of a Series Circuit
g.) Internal Resistance of Voltage Sources
h.) Load Line Analysis
i.) Voltage Regulation
j.) Troubleshooting

5.) Parallel Circuits

a.) Introduction
b.) Parallel Resistors
c.) Kirchhoff's Current Law
d.) Current Sources in Parallel
e.) Current Divider Rule
f .) Total Power of a Parallel Circuit
g.) Troubleshooting

6.) Series-Parallel Circuits

a.) Series-Parallel Resistors
b.) Redrawing the Circuit
c.) Ladder Networks
e.) Voltage Divider and Potentiometer Designs
f.) Voltage Divider Loading
g.) Wheatstone Bridge

h.) Y – Δ (or T- π) and Δ –Y (or π-T) Transformations

7.) Introduction to Network Analysis and Theorems

a.) Superposition Theorem
b.) Loop Equations
c.) Thevenin and Norton's Theorems
d.) Maximum Power Transfer

8.) Capacitors and RC Transients

a.) Introduction to Electrostatics
b.) Electric Field
c.) Capacitance and Dielectric Strength
d.) Ideal and Practical Capacitors
e.) Energy Stored by a Capacitor .
f.) Capacitors in Series
g.) Parallel Capacitors Series
h.) RC Charging Transient Circuits
i.) RC Discharging Transient Circuits
j.) Instantaneous Transients Voltages and Currents.
k.) Time Determination.

9.) Magnetism, Inductors and RL Transients

a.) Introduction to Magnetism
b.) Magnetic Poles
c.) Magnetic Field
d.) Electromagnetic Induction
e.) Faraday's Law: Induced Voltage
f.) Inductance
g.) Ideal and Practical Inductors
h.) Energy Stored by an Inductor .
i.) Inductors in Series
j.) Parallel Inductors Series
k.) RL Transients: Rising Current Circuits
l.) RL Transients: Falling Current Circuits
m.) Instantaneous Transients Voltages and Currents.
n.) Time Determination.